Sent By: Crawford PLLC;

651686 7111;

Sep-29-03 5:10PM;

Page 4

Application No. 10/077,036 Amendment dated September 29, 2003 Reply to Office Action of May 27, 2003

IN THE DRAWINGS

Please accept the attached changes to the Figures to clarify the title of Applicants' application.

Parker et al. 10/077,036

REPLACEMENT SHEET

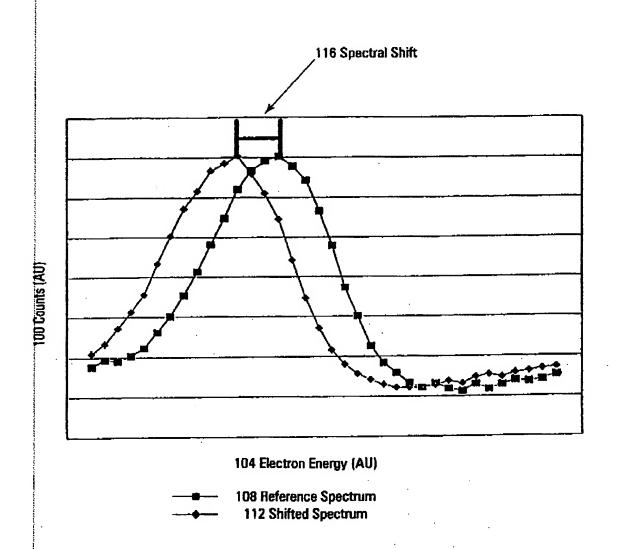
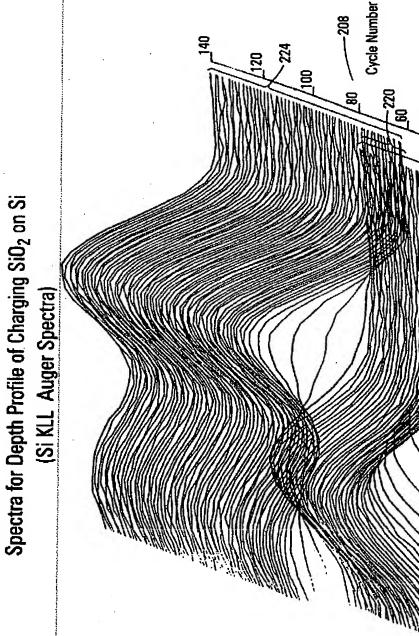


Fig. 1 Prior Art



Parker et al. 10/077,036 2/26

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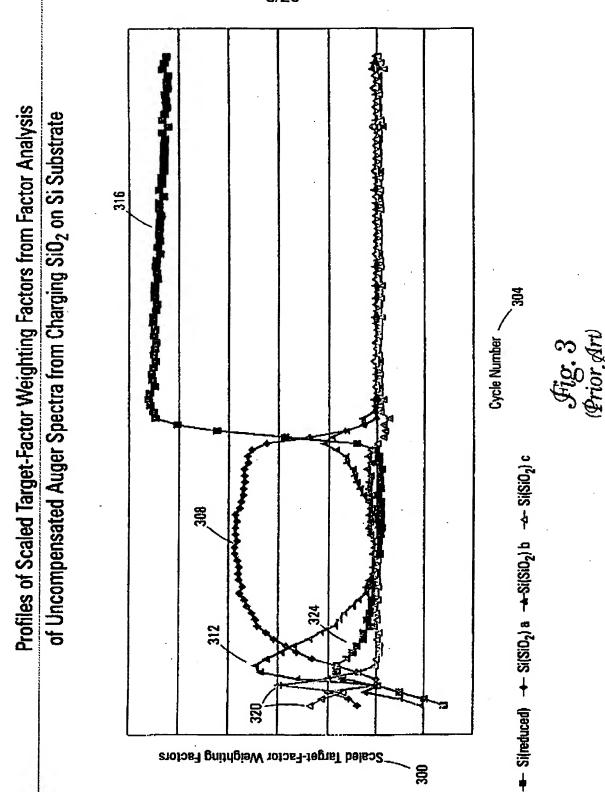
(UA) pas/simuoD

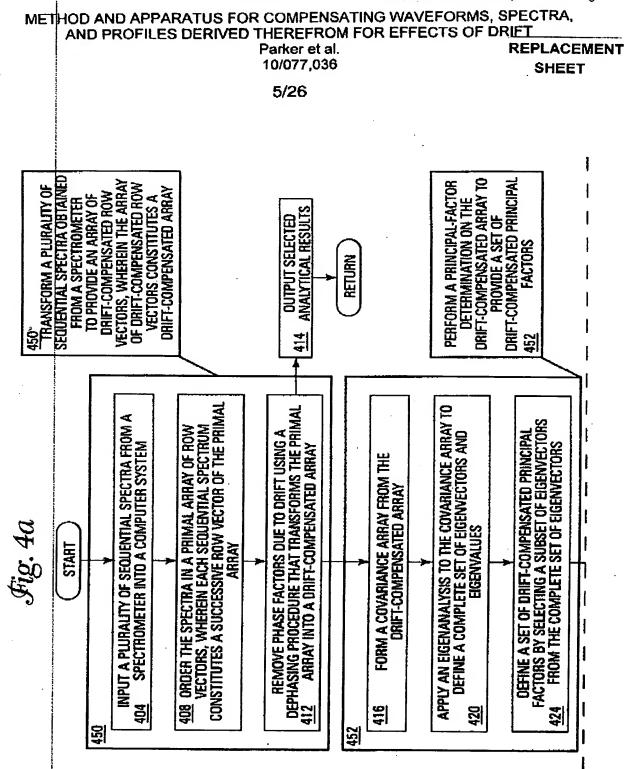
Fig. 2 (Prior drt)

Kinetic Energy, eV









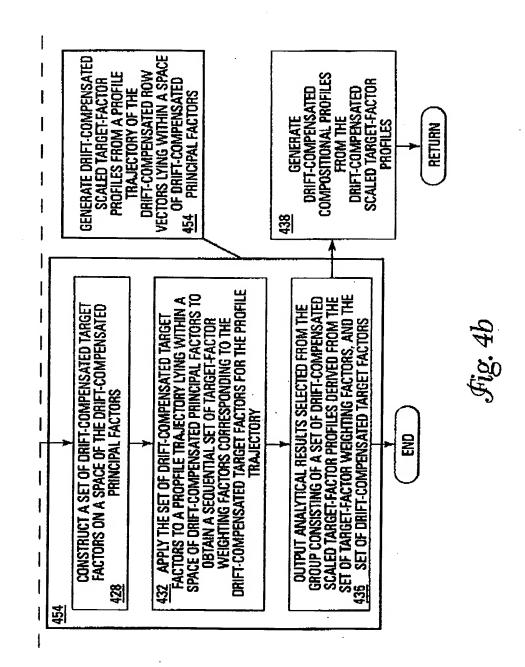
METHOD AND APPARATUS FOR COMPENSATING WAVEFORMS, SPECTRA,
AND PROFILES DERIVED THEREFROM FOR EFFECTS OF DRIFT

Parker et al.

REPLACEMENT

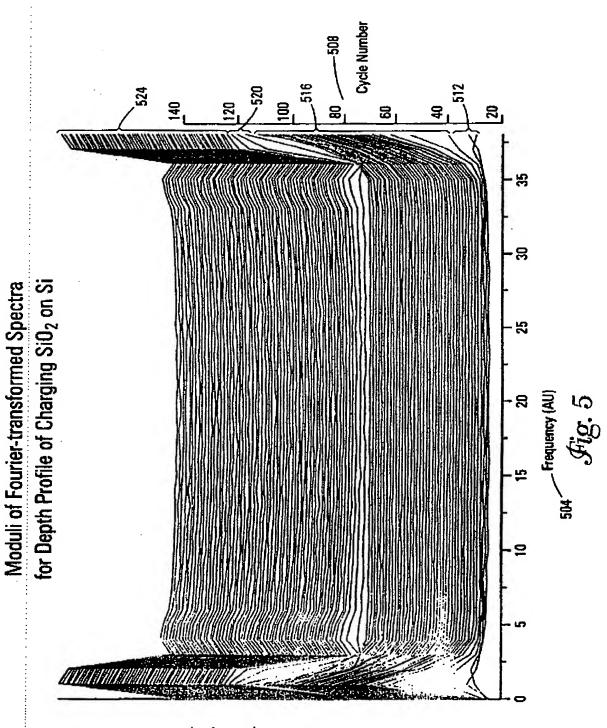
Parker et al. 10/077,036

SHEET



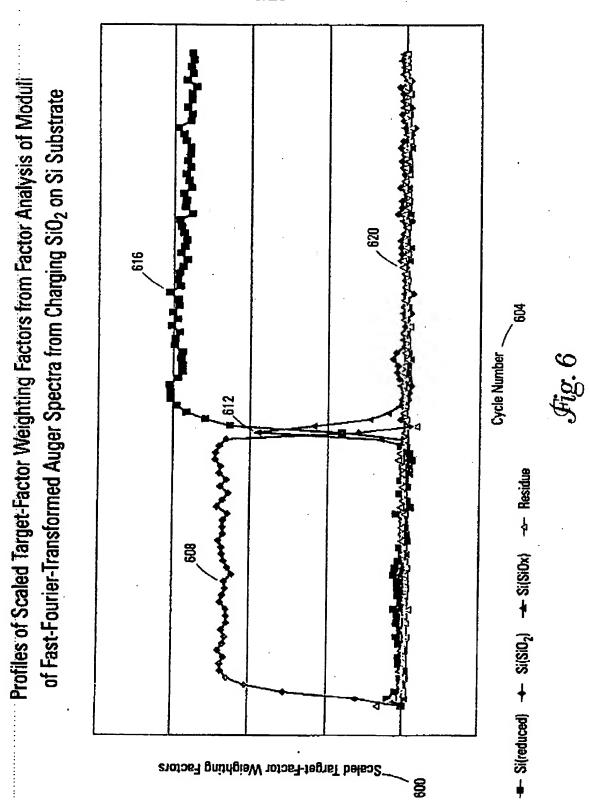
Parker et al. 10/077,036

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Parker et al. 10/077,036 REPLACEMENT SHEET

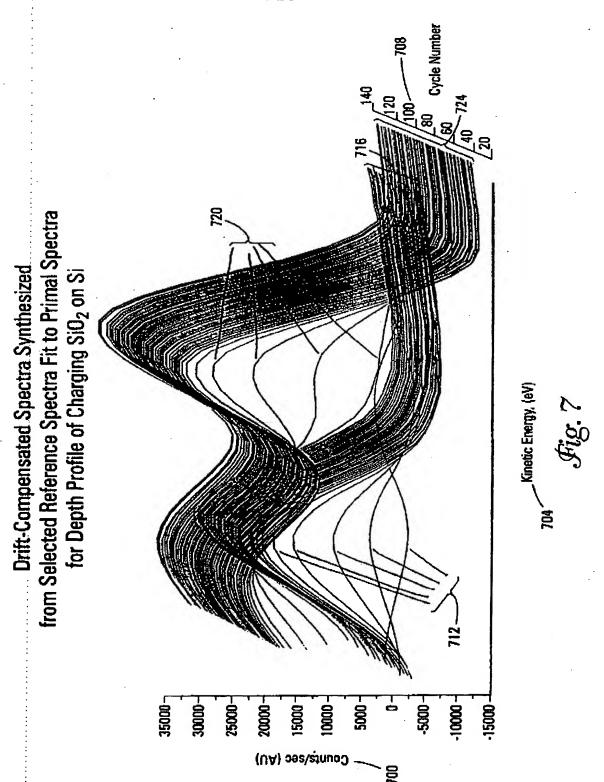






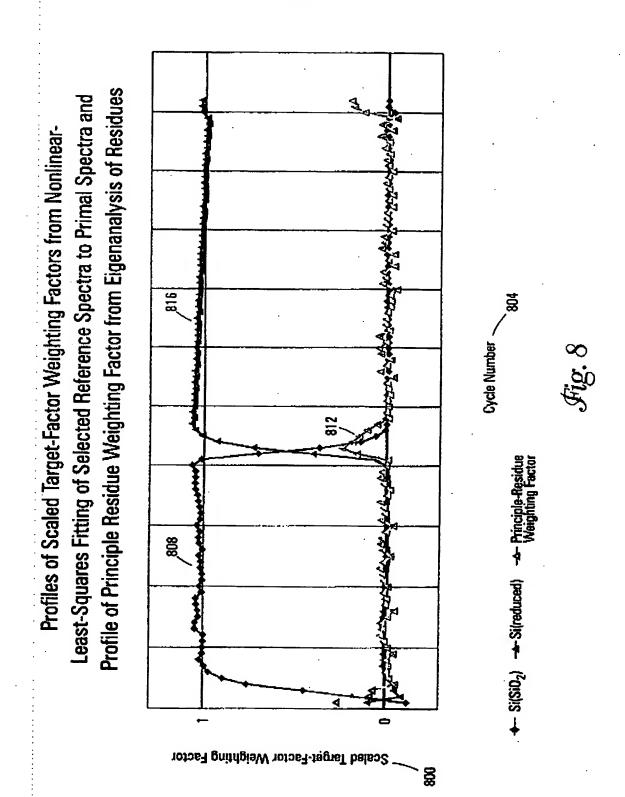
Parker et al. 10/077,036

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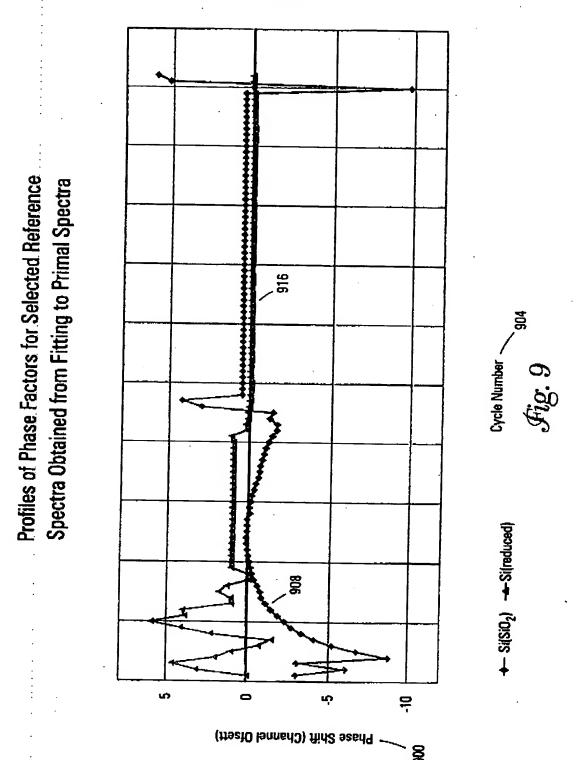


METHOD AND APPARATUS FOR COMPENSATING WAVEFORMS, SPECTRA, AND PROFILES DERIVED THEREFROM FOR EFFECTS OF DRIFT

Perfor et al REPLACEMENT

10/077,038

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Sep-29-03 5:14PM;

Page 18

METHOD AND APPARATUS FOR COMPENSATING WAVEFORMS, SPECTRA, AND PROFILES DERIVED THEREFROM FOR EFFECTS OF DRIFT

Parker et al. 10/077,036

REPLACEMENT SHEET

12/26

REMOVE PHASE FACTORS DUE TO DRIFT USING A DEPHASING PROCEDURE THAT TRANSFORMS THE PRIMAL ARRAY INTO A DRIFT-COMPENSATED ARRAY 412

1000

<u>412</u>

APPLY A FOURIER TRANSFORM TO THE SPECTRA IN THE PRIMAL ARRAY OF ROW VECTORS FORMING AN ARRAY OF TOURIER-TRANSFORMED ROW VECTORS

MULTIPLY EACH FOURIER-TRANSFORMED ROW VECTOR BY A COMPLEX CONJUGATE OF EACH FOURIER-TRANSFORMED ROW VECTOR TO FORM A SQUARED MODULI VECTOR 1020THEREBY REMOVING PHASE FACTORS DUE TO DRIFT

TAKE THE SQUARE ROOT OF EACH ELEMENT OF THE SQUARED MODULI VECTOR TO CREATE A CORRESPONDING 1030 MODULI VECTOR

FORM A DRIFT-COMPENSATED ARRAY OF MODULI VECTORS BY SUCCESSIVELY SEQUENCING THE MODULI VECTORS AS SUCCESSIVE DRIFT-COMPENSATED ROW VECTORS IN A DRIFT-COMPENSATED ARRAY, WHEREIN THE MODULI VECTORS CONSTITUTE MODULI OF FOURIER-TRANSFORMED SPECTRA

Parker et al. 10/077,036

REPLACEMENT SHEET

13/26

REMOVE PHASE FACTORS DUE TO DRIFT USING A DEPHASING PROCEDURE THAT TRANSFORMS THE PRIMAL ARRAY INTO A DRIFT-COMPENSATED ARRAY 412

412 1100 <u>412</u> APPLY A FITTING PROCEDURE TO EACH SPECTRUM IN THE PRIMAL ARRAY USING SELECTED REFERENCE SPECTRA CALCULATE THROUGH THE FITTING PROCEDURE A CORRESPONDING REFERENCE WEIGHTING FACTOR FOR EACH REFERENCE SPECTRUM CORRESPONDING TO EACH SPECTRUM IN THE PRIMAL ARRAY REMOVE THE PHASE FACTOR DUE TO DRIFT FROM EACH SPECTRUM IN THE PRIMAL ARRAY BY SYNTHESIZING A CORRESPONDING DRIFT-COMPENSATED SPECTRUM GIVEN BY THE SUM OF EACH SELECTED REFERENCE SPECTRUM MULTIPLIED BY THE CORRESPONDING REFERENCE 1130 WEIGHTING FACTOR FORM A DRIFT-COMPENSATED ARRAY BY SUCCESSIVELY SEQUENCING THE DRIFT-COMPENSATED SPECTRA AS SUCCESSIVE DRIFT-COMPENSATED ROW VECTORS IN THE **DRIFT-COMPENSATED ARRAY** 1140

Parker et al. 10/077,036

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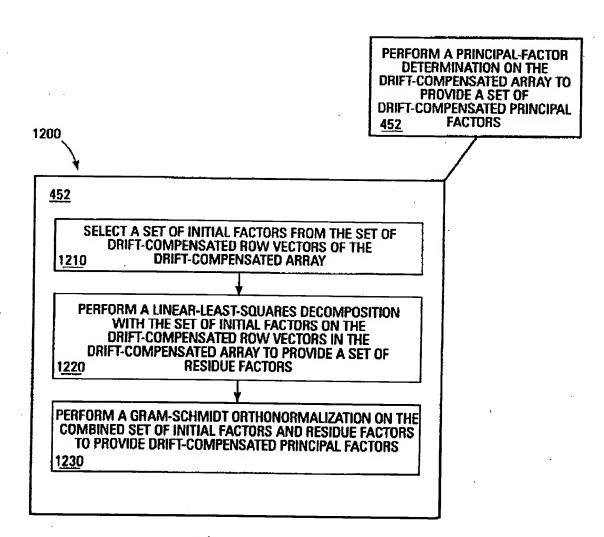


Fig. 12

Sep-29-03 5:15PM;

Page 21/33

METHOD AND APPARATUS FOR COMPENSATING WAVEFORMS, SPECTRA, AND PROFILES DERIVED THEREFROM FOR EFFECTS OF DRIFT

Parker et al. 10/077,036

REPLACEMENT

15/26

CONSTRUCT A SET OF DRIFT-COMPENSATED TARGET FACTORS ON A SPACE OF THE DRIFT-COMPENSATED PRINCIPAL 428 FACTORS

1300

428

GENERATE A PROFILE TRAJECTORY ON A 3-DIMENSIONAL PROJECTION OF A 4-DIMENSIONAL SPACE OF A SET OF FIRST-FOUR, DRIFT-COMPENSATED PRINCIPAL FACTORS ALONG WITH A REFERENCE TETRAHEDRON THE VERTICES OF WHICH REPRESENT EACH OF THE FIRST-FOUR, DRIFT-COMPENSATED PRINCIPAL FACTORS

ENCLOSE THE PROFILE TRAJECTORY WITHIN AN ENCLOSING TETRAHEDRON WITH VERTICES CENTERED ON END-POINTS AND IN PROXIMITY TO TURNING POINTS OF THE PROFILE TRAJECTORY, AND WITH FACES LYING ESSENTIALLY TANGENT TO PORTIONS OF THE PROFILE 1320 TRAJECTORY

CALCULATE THE DRIFT-COMPENSATED TARGET FACTORS FROM THE NORMED COORDINATES OF THE VERTICES OF THE ENCLOSING TETRAHEDRON IN TERMS OF THE 1330 DRIFT-COMPENSATED PRINCIPAL FACTORS

Parker et al. 10/077,036 16/26 REPLACEMENT SHEET

GENERATE A PROFILE
TRAJECTORY ON A
3-DIMENSIONAL PROJECTION OF
A 4-DIMENSIONAL SPACE OF A
FIRST-FOUR,
DRIFT-COMPENSATED PRINCIPAL
FACTORS ALONG WITH A
REFERENCE TETRAHEDRON THE
VERTICES OF WHICH REPRESENT
EACH OF THE FIRST-FOUR,
DRIFT-COMPENSATED PRINCIPAL
1310 FACTORS

1400

<u>1310</u>

1410 CALCULATE 4-SPACE COORDINATES OF A PROFILE TRAJECTORY OF DRIFT-COMPENSATED TARGET-FACTOR PROFILES ON A 4-DIMENSIONAL SPACE TO PRODUCE FOUR COORDINATES FOR EACH POINT IN THE PROFILE TRAJECTORY, ONE COORDINATE FOR EACH OF THE FIRST-FOUR, DRIFT-COMPENSATED PRINCIPAL FACTORS

REDUCE THE DIMENSIONALITY OF THE COORDINATES OF THE PROFILE TRAJECTORY BY DIVIDING EACH COORDINATE BY A SUM OF ALL FOUR 4-SPACE COORDINATES TO PRODUCE NORMED COORDINATES FOR THE PROFILE 1420 TRAJECTORY

PLOT THE NORMED COORDINATES FOR THE PROFILE
TRAJECTORY IN A 3-DIMENSIONAL SPACE THE
COORDINATES AXES OF WHICH ARE EDGES OF A
REFERENCE TETRAHEDRON, THE VERTICES OF WHICH
CORRESPOND TO UNIT VALUES FOR EACH OF THE
FIRST-FOUR, DRIFT-COMPENSATED PRINCIPAL FACTORS IN A
MANNER ANALOGOUS TO PLOTTING OF COORDINATES ON A
1430
QUATERNARY PHASE DIAGRAM

Parker et al. 10/077,036

REPLACEMENT SHEET

17/26

ENCLOSE THE PROFILE TRAJECTORY WITHIN AN **ENCLOSING TETRAHEDRON WITH VERTICES CENTERED ON END-POINTS AND IN PROXIMITY** TO TURNING POINTS OF THE PROFILE TRAJECTORY, AND WITH FACES LYING ESSENTIALLY **TANGENT TO PORTIONS OF THE** PROFILE TRAJECTORY: AND. **CALCULATE THE** DRIFT-COMPENSATED TARGET **FACTORS FROM THE NORMED** COORDINATES OF THE VERTICES OF THE ENCLOSING TETRAHEDRON IN TERMS OF THE **DRIFT-COMPENSATED PRINCIPAL** 1320 & 1330 FACTORS

1500 1320 & 1330 PLACE VERTICES OF AN ENCLOSING TETRAHEDRON AT LOCI OF HEAVY POINT CONCENTRATIONS OF A PROFILE 1510 TRAJECTORY ADJUST THE EDGES OF AN ENCLOSING TETRAHEDRON TO LIE ALONG ESSENTIALLY STRAIGHT LINE 1520 **SEGMENTS** PLACE REMAINING VERTICES OF AN ENCLOSING TETRAHEDRON SO AS TO LIE NEAR THE TURNING POINTS OF 1530 THE PROFILE TRAJECTORY ADJUST THE FACES OF THE ENCLOSING TETRAHEDRON TO LIE ALONG CURVED SEGMENTS JOINING A TURNING POINT AND ESSENTIALLY STRAIGHT LINE SEGMENTS OF THE 1540 **PROFILE TRAJECTORY**

Parker et al. 10/077,036

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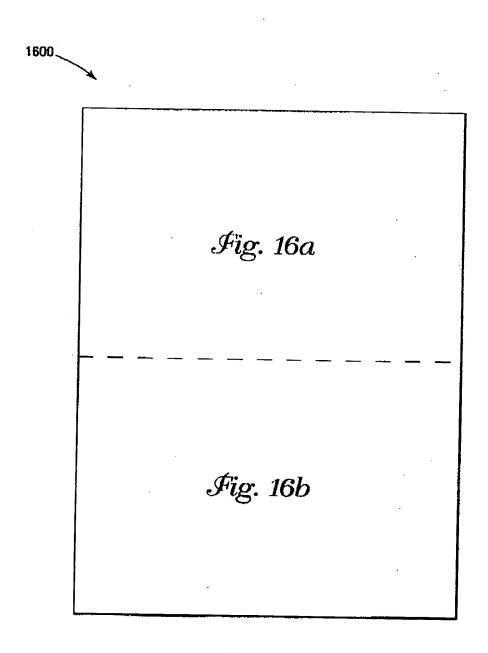
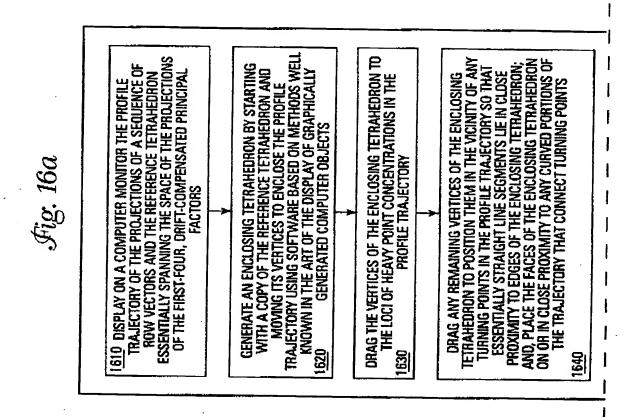


Fig. 16

Parker et al. 10/077,036 19/26 REPLACEMENT SHEET



Parker et al. 10/077,036

REPLACEMENT SHEET

20/26

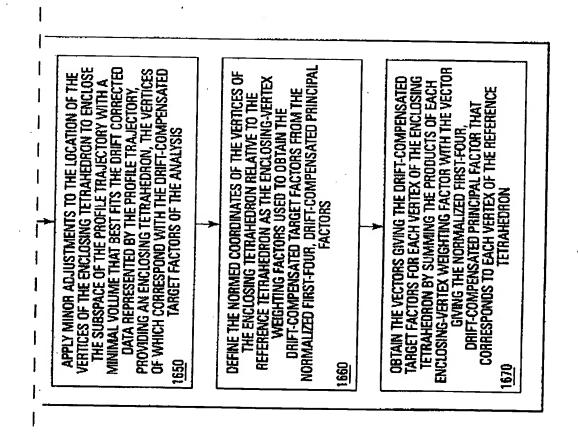
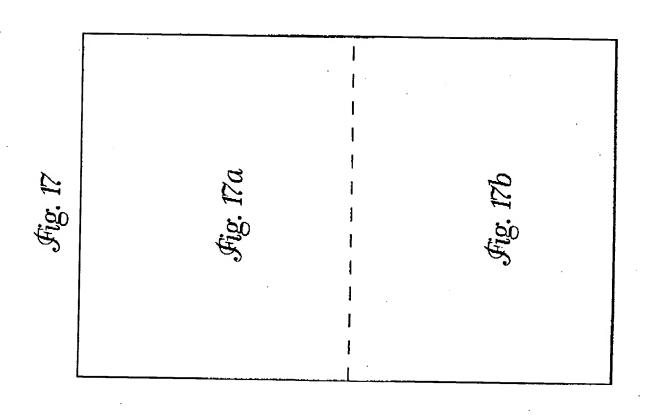


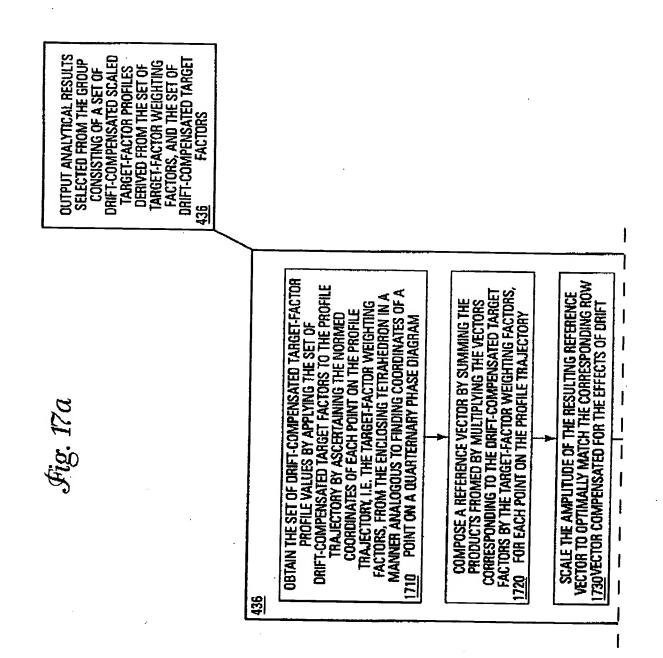
Fig. 16b

Parker et al. 10/077,036

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Parker et al. 10/077,036

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23/26

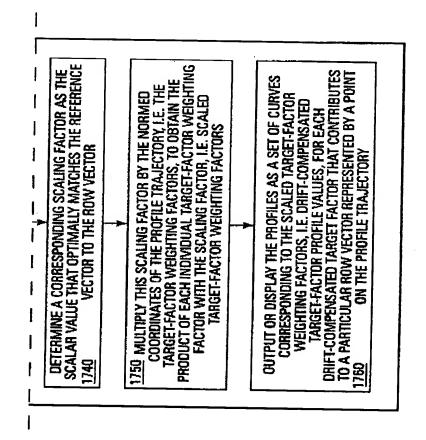


Fig. 17b

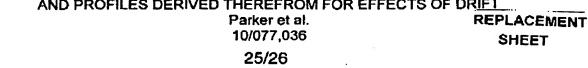
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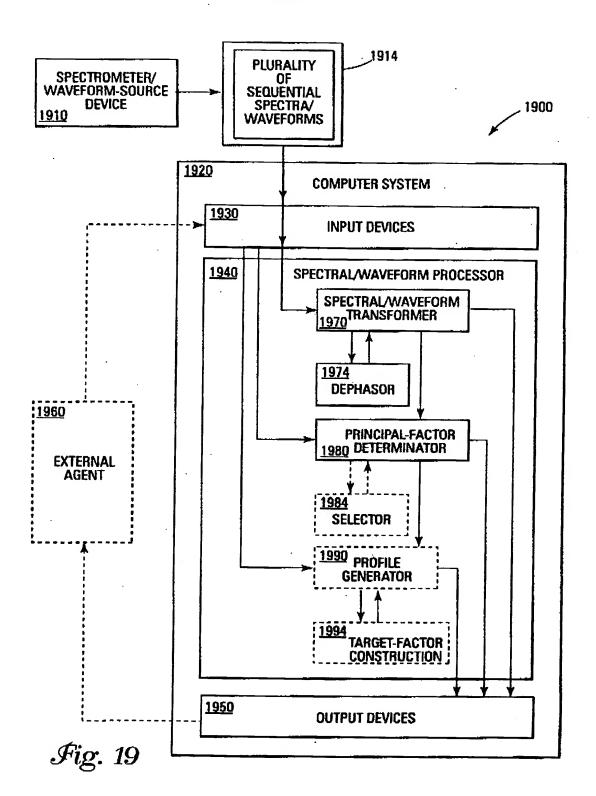
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24/26

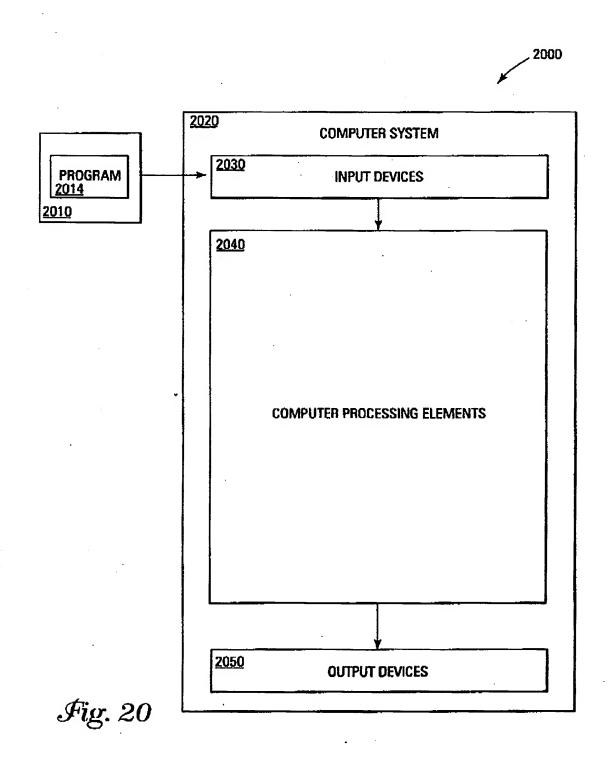
1800 DEFINE A SET OF DRIFT-COMPENSATED SCALED TARGET-FACTOR PROFILE VALUES AS THE SET OF SCALED 1810 TARGET-FACTOR WEIGHTING FACTORS **DIVIDE EACH DRIFT-COMPENSATED SCALED** TARGET-FACTOR PROFILE VALUE BY A PROFILE SENSITIVITY FACTOR FOR EACH CONSTITUENT CORRESPONDING TO THE TARGET FACTOR TO PROVIDE A SENSITIVITY-SCALED 1820 TARGET-FACTOR PROFILE VALUE NORMALIZE THE SENSITIVITY-SCALED TARGET-FACTOR PROFILE VALUE BY DIVIDING EACH SENSITIVITY-SCALED TARGET-FACTOR PROFILE VALUE FOR A GIVEN CYCLE NUMBER BY THE SUM OF ALL THE SENSITIVITY-SCALED TARGET-FACTOR PROFILE VALUES FOR THE GIVEN CYCLE NUMBER TO PROVIDE DRIFT-COMPENSATED COMPOSITIONAL PROFILE VALUES AT THE GIVE CYCLE 1<u>830</u> NUMBER **OUTPUT THE DRIFT-COMPENSATED COMPOSITIONAL** PROFILE VALUES AS A SET OF DRIFT-COMPENSATED 1840 **COMPOSITIONAL PROFILES**

Fig. 18





Parker et al. 10/077,036 REPLACEMENT SHEET



Parker et al. 10/077,036

REPLACEMENT SHEET

